44TH CONGRESS, 1st Session. } HOUSE OF REPRESENTATIVES. { EX. DOC. No. 180.

CONDITION OF THE UNION PACIFIC RAILROAD.

LETTER

FROM THE

SECRETARY OF THE INTERIOR,

TRANSMITTING

REPORT OF ISAAC N. MORRIS,

ONE OF THE

Commissioners appointed to examine the unaccepted portions of the Union Pacific Railroad.

JUNE 3, 1876.—Referred to the Committee on the Pacific Railroad.
JUNE 20, 1876.—Ordered to be printed.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., May 26, 1876.

SIR: In compliance with House resolution of yesterday, I have the honor to transmit herewith a copy of the report of Hon. Isaac N. Morris, made to the President of the United States, under date of 28th May, 1869, on the condition of the Union Pacific Railroad between Omaha and the summit of the Rocky Mountains.

I am, sir, very respectfully, your obedient servant,

Z. CHANDLER,
Secretary.

Hon. M. C. KERR,
Speaker of House of Representatives.

MAY 28, 1869.

Mr. PRESIDENT: On the 13th day of March last your Excellency tendered me an appointment as one of the commissioners "to examine and report to the President of the United States upon the road and telegraph line of the Union Pacific Railroad Company as contemplated and specified by an act to aid in the construction of a railroad and telegraph line from the Missouri River to the Pacific Ocean, and to secure the Government the use of the same for postal, military, and other purposes."

Accompanying your letter of appointment, was a communication of the Hon. J. D. Cox, Secretary of the Interior, in which he says:

In case you accept the appointment you will be guided in the discharge of your duties, as commissioner, by the instructions embodied in the report of a board convened to determine on a standard for construction of the Pacific Railroad, dated February 24, 1866, a copy of which is herewith transmitted.

From the tenor of these documents, I suppose that, in making my report, I am to look both to the law and to the standard of construction embodied in the proceedings of the board.

The fourth section of the charter of the company provides, among other things—

That whenever said company shall have completed forty consecutive miles of any portion of said railroad and telegraph line, ready for the service contemplated by this act, and supplied with all necessary drains, culverts, viaducts, crossings, sidings, bridges, turn-outs, watering-places, depots, equipments, furniture, and all other appurtenances of a first-class railroad, the rails, and all other iron used in the construction and equipment of said road to be of American manufacture, of the best quality, the President of the United States shall appoint three commissioners to examine the same, and report to him in relation thereto, and if it shall appear to him that forty consecutive miles of said railroad and telegraph line have been completed and equipped in all respects as required by this act, then, upon certificate of said commissioners to that effect, patents shall issue conveying the right and title to said lands to said company, on each side of the road as far as the same is completed, to the amount aforesaid; and patents shall, in like manner, issue as each forty miles of said railroad and telegraph line are completed, upon certificate of said commissioners.

It will be seen by this provision that Congress contemplated and provided for the construction only of a "first-class railroad" "in all respects," though it failed to specify in every detail what should constitute a "first-class road."

It also provided that, until the commissioners reported that such a railroad had been constructed by the company, the lands granted in aid thereof should not be conveyed. The law is explicit on this point.

The fifth section of the charter is equally explicit that, "upon the certificate in writing of said commissioners of the completion and equipment of forty consecutive miles of railroad and telegraph line in accordance with this act," the "Secretary of the Treasury shall issue to said company bonds of the United States of $1,000 each, payable in thirty years after date, bearing 6 per cent. interest, (said interest payable semi-annually,) which interest may be paid in United States Treasury notes, or any other money or currency which the United States have or shall declare lawful money and a legal tender, to the amount of sixteen of said bonds per mile for such section of forty miles." The said fifth section also provides that upon the issue and delivery of said bonds to the company they "shall *ipso facto* constitute a first mortgage on the whole line of the railroad and telegraph, together with the rolling-stock, fixtures, and property of every kind and description," and in consideration of which said bonds were only to be issued by the terms of the act, thus showing that Congress was careful that the railroad should not only be a "first-class" one, but the company was to have no bonds until a "first-class railroad" was built, and further not until their payment was secured. Hence I should regard myself as criminally negligent if I failed to "report," as you instruct me in your letter, upon the road and telegraph line of the Union Pacific Railroad Company as contemplated by said acts, "meaning the acts providing for its construction." The law is much broader and more comprehensive than the "standard of construction," and is of course the governing power. It admits of no compromise with its provisions.

The $16,000 per mile provided for in the fourth section of the charter was changed by the eleventh section to $16,000, $32,000, and $48,000

per mile for certain distances, in a manner so artful that no one on reading the law can tell what it means. Extraneous facts must be resorted to as the key to unlock it. A tabular statement which I shall insert in a subsequent part of my report will show the number of miles upon which $48,000 was paid per mile, the number upon which $32,000 was paid per mile, and the number upon which $16,000 was paid per mile. It is a strange feature of the legislation that there should exist two provisions upon precisely the same point in the same law conflicting directly with each other, yet such is the fact. I have not been able to find any change in any act I have examined more favorable to the Government, but numerous ones more favorable to the companies. Whether this was wise can be more readily determined by the facts disclosed in the sequel.

In view of the omission in the charter to specify all the details of construction, the Hon. James Harlan, then Secretary of the Interior, convened a board of Government commissioners, directors, and an engineer to determine on a standard for the Pacific Railroad and branches. It is, perhaps, better, with a view to a more intelligent understanding of the subject, to quote such material parts of the requirements fixed upon by the board as bear more directly upon that part of the road which I was charged with the duty of examining in part.

EMBANKMENTS AND EXCAVATIONS

In all parts of the main line of road or branches embankments should not be less than fourteen feet wide at the grade-line. Excavations, if the cuts are lengthy, should be 26 feet wide and in shorter cuts at least 24 feet, thus leaving in all cases room for continuous side ditches of ample depth and width, so as to secure that most essential requisite, a well-drained road-bed. Rock excavations should not be less than 16 feet wide, and all tunnels should be excavated for a double track. Slopes of earth embankments should be one and a half base to one rise. Excavations, except in rock, should have slopes from one to one and a half base to one rise, depending upon the material: or, if steeper, then to have increased width at grade, so as to remove the same quantity of earth contained within the slope.

MECHANICAL STRUCTURES.

Culverts and abutments for bridges and drains should be of stone, whenever a durable article can be obtained within a reasonable distance, say from five to eight miles, depending upon circumstances; provided that temporary trestles may be adopted upon assurance, to the satisfaction of the commissioners, that stone abutments will be substituted immediately after the line shall be opened so that stone can be transported thereon; but if good stone be too remote, then hard-burned brick or wooden trestle-work may be adopted. The wood to be of the most durable character the country will afford, and the wood or brick to be replaced by stone when that material can be conveyed conveniently by rail. Bridges of stone, or iron, or wood, (such as the Howe truss, or other equally good structure,) should be used at the discretion of the company.

BALLASTING.

A railroad cannot be considered complete until it is well ballasted. If composed of gravel or broken stone, it should be from 12 to 24 inches thick, depending on the lower material. In view of the settling of new embankments, which require time and rains before ballasting can be properly placed, and also in view of the number of miles required by law to be constructed annually, the perfect finish of the road-bed in this respect must be progressive, and the work of time. Yet it is the opinion of the board that such work of perfecting the ballast must proceed as usual on first-class railroads; otherwise subsequent sections should not be accepted, because the whole work is not then being carried forward as a great Pacific railroad, such as the law contemplates.

CROSS-TIES.

Oak or other suitable timber should be used, where it can be obtained with reasonable transportation. When such timber cannot be had for all the ties at reasonable cost, then the best the country affords may be adopted; but if it be cottonwood or similar soft material, it must be burnettized or kyanized thoroughly, so as to increase its durability. But in all cases the joint-tie should be of oak, or other suitable timber, the better to hold the

spikes at these points. There should be at least 2,400 ties to the mile. They should be eight feet long, six inches thick, and, if hewn, six inches on the face. If sawed, they should not be less than eight inches wide and not less than 2,400 per mile, or such number as will have the same bearing-surface, provided that, if any sawed ties have been already delivered or contracted for only seven inches wide, they may be laid down.

Whether the standard fixed upon by the board is a matter which a commissioner is allowed to look into may be regarded as problematical. But I cannot refrain from saying it seems strange that the board should designate what materials it was necessary to use in the construction of a "first-class railroad in all respects," and then concede that if the company could not obtain such materials conveniently, inferior articles might be used. The law makes no such concession, and if it had, it never could have been passed. It is stated, for example, that culverts and abutments for bridges should be of "stone," without specifying what kind of stone should be used, except to add the vague term "desirable article," (indefinite, to be sure,) "when it can be obtained within a reasonable distance, say from five to eight miles." Again, it is stated that oak or other suitable timber should be used for cross-ties, "where it can be obtained within reasonable transportation." What would be "reasonable transportation" is not defined, nor have the commissioners any jurisdiction over the question. They can only report on the materials used, and the condition of the road, and then the law determines whether the road has been built in compliance with its provisions.

Taking, however, the "law" and "standard" fixed upon by the board, vague and indefinite though the latter is, as a guide, the question arises whether that part of the Union Pacific Railroad which the present commissioners were charged with the duty of examining is constructed and equipped as the "law" and "standard" require.

The whole length of the road is given at 1,086 miles, or within a fraction of a mile of that, and is so stated in round numbers, extending from Omaha to the eastern summit of the Promontory range of mountains, which is, in fact, but one of the outposts of the Rocky Mountains. That part of it which the present commissioners were directed to examine commences a short distance west of Echo, on the Wasatch range, which is situated twenty-six miles west of the summit of the Wasatch mountains. There is at this initial point, so to speak, a tree upon which is a sign-board designating the distance to Omaha at 1,086 miles. It stands between the road-bed and the Echo River, which empties, a few miles below, into the Weber, and is about twenty feet from each. From this point to the eastern summit of the Promontory range is eighty-six miles, or four sections of twenty miles each, and a fractional section of five miles and eight-tenths of a mile. For descriptive purposes it is best to divide this portion of the road into three parts:

First. From the Thousand-Mile tree to where it enters the valley of Salt Lake, a distance of twenty-three miles.

Second. From the valley of Salt Lake, a distance of fifty-three miles and eight-tenths of a mile, to the base of the Promontory Mountain.

Third. From the base of the Promontory range to the summit, a distance in round numbers of nine miles.

These distances were furnished me by General M. F. Hurd, of Grinnell, Iowa, one of the engineers engaged upon the work, and to whom I am indebted also for other valuable information.

I passed over the four sections and the six-twentieths of a section twice, and a part of it four times, on a special car kindly furnished by the company and placed in charge of Chief Assistant Engineer Jacob House, occupying a seat on the rear platform of the car, with memo-

randum-book in hand, causing it to move slowly, and stop at points where I desired to examine the road-bed, ties, cuts, &c. Perhaps it is best I should commence a description of the road at the eastern Promontory summit, where the "last spike," a golden one, was driven, and where it joins the Central Pacific. This summit is a considerable plateau, covered with artemisia, and quietly resting between two mountain combs or crests. Some thirty tents and a few board sheds mark the spot. The trader had reached it with his wares as soon as the road itself. It is a lonely and desolate locality, without water or fuel, both of which have to be brought from a distance, and Promontory City, as it is called, is not likely to become a commercial emporium, while it will have some fame and a romantic interest attached to it as the place where the Atlantic and Pacific first embraced. No railroad buildings have been erected there, except one or two mere sheds for the storage of baggage and the use of the telegraph, nor, indeed, are there any buildings on the line of the road from that point to the Thousand-Mile tree, such as the law requires. Two or three small ones are to be found on the route, one at Corinne, and one at Taylor's Mill, three miles east of Ogden, which are used for boarding and lodging the hands and for other road purposes. Taylor's Mill is the principal stopping-place for Salt Lake City, and unless the railroad from that city to Ogden, which the Mormons contemplate building, dispenses with the necessity of erecting a large depot and other buildings at that place, and shall require them at the point where the Salt Lake road shall cross the main track of the Union Pacific, there is certainly no place on the whole line of the road where they are so much required. Evidently the first and, it may be said, natural object of the company was to extend the line of its road without regard to much, if anything, else than what was indispensable to the necessities arising out of its construction. Five hundred and thirty miles, as I was informed, were built within the past year, and, to repeat the idea just expressed, the whole road was pushed forward in too much of a hurry, both in regard to economy and durability. There was a temptation to do this offered by subsidies and lands too great for poor, avaricious human nature to resist, and it was done in direct violation of the standard of construction agreed upon by the board, who state in their report that "the arguments in favor of a speedy construction must be subordinate to the substantial objects of the road, and the Government must be certain to have a work that will convey her mails, troops, and munitions of war, and the commerce of the country with entire celerity and convenience. It is the aim of this board to secure all these objects, and it is also our belief that they are not incompatible, it being only necessary on the part of the Government to insist on the reasonable requirements embodied in this report to hasten the completion of the great work, and at the same time to adapt it to the high public interest which it was intended to subserve."

The great error was in allowing two companies to build the road, one on the Pacific slope and one on this side, without Congress having fixed the point at which they should meet. The grants of lands and Government subsidies were erroneous, and whichever company built the most miles of road would receive the most of each. Hence there was an emulation arising from a consideration of pecuniary advantage, which stimulated each to almost superhuman effort, and finally culminated in an open rupture, requiring congressional intervention. Gangs of men were worked day and night, and on the Sabbath the same as any other day. Time was too precious to incur delay in procuring the best material or performing the work in the best manner. The great primary

object of the companies was money, and this fact is patent from what I have just stated, and must be made more manifest by time. The road, by the charter, was to be completed by the first day of July, 1876, but its completion is announced in May, 1869! This may be American enterprise, or it may be American recklessness.

That a railroad connecting the Atlantic with the Pacific States is a great desideratum no one will question. But that road should be as good as any, if not the best, in the world. Congress, as has been shown, intended it should be so, or otherwise that body would not have endowed it so liberally. Its object was one of patriotism, to establish a great commercial and social highway between the two sections of the Union. The object of the builders was, of course, profit. I suppose it is my duty to speak of the road as I saw it, and not as it may in the future be made—by whom is another question. A person traveling over it to or from the Pacific Ocean, transported with the idea that he can now make a journey in a few days which heretofore required from four to six weeks, knows but little more than this of the work.

From Promontory Summit to the foot of Promontory Mountain.—The road from Promontory Summit to the foot of the mountain is the most difficult of construction, except the tunnels, of any part I examined.

For a mile and a half the ties, it is true, are virtually laid on the ground, but the road then passes through several sand-banks, some comparatively small and some of formidable proportions, with intervening spaces of nearly level surface; thence it passes through rock excavations, one being some forty feet deep and a quarter of a mile long through the heaviest body of the mountain, overlooking Salt Lake; thence it sweeps around the mountain's side to its base, describing in its course a succession of short curves, so sharp indeed that an ascending and descending train would collide before either would be aware of the proximity of the other. I measured the width of the cuts, and found them so nearly in compliance with the standard of construction that they may be so regarded. The banks on either side I regard as reasonably safe. Before reaching the descending curve running on the side of the mountain, two dells or ravines are crossed on trestle-work, one, as nearly as I could judge, (for the atmosphere is so light in that latitude that distance is very deceptive to one not accustomed to it,) about two hundred and fifty feet long and from seventy to eighty feet deep; the other, about one hundred feet long and thirty feet deep. These trestle-structures, unknown to the law, but familiar to the line of road, and one over Blue Creek, not far distant, are very frail and dangerous. It is the purpose of the company, I was told, to fill up these ravines so as to have a solid road bed over them. The sooner this is done the better for the safety of lives and property. The grade was said to be eighty feet to the mile, but it must be much greater than this a part of the way. The grade of the Central Pacific down this mountain, partly finished, is still greater, and its curves sharper. The engineers evidently did not agree in their surveys. The rails laid on this grade being the same as those used in the valley, 56 pounds to the linear yard, are evidently too light; nor are the ties large enough to insure safety. A heavy train, should it run off the track when going at reasonable speed, would certainly crush them.

The road in the valley of Salt Lake.—There is so much sameness in this portion of the work that it is hard to distinguish between the different parts. It passes over a uniform valley, with the exception of a small clay cutting east of Taylor's Mill, with a surface as even as will generally be found on what we call a level plain. Indeed, it is rare that a

distance of fifty-three and eight-tenths miles is subject to so few depressions and elevations. The grade varies from an even surface to 2 or 3 feet, and the road-bed was constructed almost entirely with plows and scrapers. Its shaggy and unpolished appearance does not indicate that it was ever familiar with any other than rude implements. While this does not detract from its usefulness, it does from its cheerfulness, and indicates an inexcusable slovenliness and want of finish. I examined a piece of the road-bed constructed in this valley by the Central Pacific Company, and found it of a uniform width of 14 feet, and neatly finished.

The Union Pacific road-bed is neither of these. Its width at the grade-line on embankments, especially where it should be the widest, if any difference existed, is only the width of the tie, or 8 feet, sometimes a little over and sometimes a little under. In several places I saw the ends of the ties projecting over the embankment. What is here said of the road-bed in the valley will apply equally to that part of it lying east which I examined. Its composition is a mixture of dirt and sand, sometimes sand with comparatively few small gravel, and occasionally sand alone. Again, places are found where it is mostly dirt, and then portions are met which are chiefly, if not entirely, of gravel. Near the northern extremity of Salt Lake the mud-flats, as they are called by railroad men, are crossed. My impression when I saw them was that they were sand deposits. The lake has, evidently, once been over them, and, indeed, at one or two points now stretches its saline waters so far toward the mountains that they have to be crossed by trestle-work. It is a remarkable phenomenon of Salt Lake, which is surrounded by a rim of mountains and has no known outlet, that it has risen 9½ feet in the last four years, and is still gradually rising. It has evidently one day been a bed of water of much greater depth than it is now, and I heard the opinion expressed that serious apprehensions were entertained that it is again gradually approaching its original elevation. Should it continue to rise—of which no man knows or can know anything with certainty, the mysterious laws operating upon it being a sealed book—it will not be long until the road-bed in the valley will be interfered with, and possibly, in time, may be entirely submerged.

The region extending from the base of Promontory Mountains to Ogden is strongly impregnated with alkali, as are other sections, and a slight rain makes it very muddy. It is useless to add that ties laid upon such ground would easily work loose after exposure to water, unless firmly ballasted with stone.

There are about sixteen culverts in the valley. As I saw them at a dry time I am not able to estimate how many cubic feet of water passes through each per minute after a copious rain; of course, some more and some less. These culverts, with two exceptions, which had sandstone abutments, are constructed of pine timber. Substantial stone abutments should be substituted as soon as possible. They are evidently required by public interest and the standard of construction. The two principal streams which make their way through the valley and empty their waters into Salt Lake, are Bear River and Ogden River. The first of these is infinitely the larger, and is rarely known to be less than eighteen feet deep, and when I crossed it was twenty-three; has a rapid current, and is a formidable stream. It is crossed by trestle-work, which must be regarded as frail and dangerous. A bridge is said to be contemplated, but nothing visible to me was done toward its erection. Ogden River is not formidable, and is crossed as other streams are.

The road from the eastern terminus of Salt Lake.—At the eastern termination of the valley, the road passes around a mountain-spur, the track cutting at its base first through a sand-bank, then a stone embedment, and passes up Weber River for a mile, where the waters of the stream describe a half circle through the mountain, and rush with great force down the chasm. This spot is so gloomy and dangerous that it has received the soubriquet of Devil's Gate. Here, for the first time in going east, the Weber is crossed, at a point ten miles from where it empties into Salt Lake. Timber for a bridge is being prepared, but no visible stone-work is being done. The bridge is to be 17 feet wide and 230 feet long. At present the stream is crossed on trestle-work 78 feet high, and is what may be termed a double trestle, one resting on the other. The main supporting-timbers stand at an angle of about 40 degrees, gradually narrowing from the base to the top. The upper ones, among other means adopted to prevent their giving way, are secured by large ropes tied around them and fastened to projecting rocks above. The current being very rapid and the volume of water large, this structure is extremely dangerous. One of the chief mechanics, a young man by the name of Bowman, from Chicago, the day after I passed fell into the turbid waters, was swept away and drowned, it being impossible for any one to survive in such a current. I mention this to show that if a train should go down into this fearful gulf, all who escaped being crushed would, in all human probability, be drowned.

On my return the cars were detained twenty-four hours to have the trestles better secured by means of additional braces. They are now much safer, but far from being secure. An iron bridge at this point seems to me indispensable.

From Devil's Gate to the One Thousand-Mile tree is twenty-two miles in round numbers. Weber River is crossed five times in this distance, and some fifteen culverts are also found. In the mountains adjacent to this locality a red sandstone abounds, which has been used for abutments and piers. This sandstone can be had in large blocks or slabs at slight cost. Whether they will stand the action of water, frost, and the atmosphere is questionable. Those from the same quarry have a somewhat different solidity, but are evidently composed of the same elements, a calcareous substance doubtless being one of them. I procured four specimens, ranging from the hardest to the softest, which I transmit with my report for your excellency's inspection, and suggest their analyzation. I carefully examined the abutments of two culverts at Morgan City, and found that a part of the blocks in them was rapidly decomposing; others lying on the ground were crumbling to pieces—seemed, indeed, quite rotten. Yet these stones were only obtained from the beds during last winter. It will require time to determine whether any of them will answer the purpose for which they are used. I am satisfied they will not long bear a great pressure—certainly not greater than good brick; still, if they do not break or decompose, they may answer for abutments and piers where a large body of them are together. I use the word "may," but my belief is they will prove an entire failure. Although of a different consistency they belong to the same family and all have the same doubtful character. Safety and permanency require that a more substantial and durable article should be used. I saw another stone at Green River, (not within the line of the road I was charged with examining, yet I cannot refrain from mentioning the fact,) of a grayish color, which appeared to be, and is indeed, very hard, and can be obtained in large blocks. This stone was used to fill up the treacherous log cribs sunk in the river, upon which a temporary bridge, so

called, rested. It has been ascertained, however, as I was informed by a gentleman in charge of that division of the road, that it contained soda or other alkali substance, and the water disintegrated it. It has proven so entirely worthless that it will have to be abandoned. Whether such will prove to be the case with all the rock in the mountain-ranges remains to be tested. The day I reached Green River on my return, the eastern abutment had given way and the train could go no farther. Passengers crossed the so-called bridge on foot, and took another train. There is a green sandstone, which I saw used for two culverts, but it is evidently like the balance. It is clear to my mind that the mountain sandstone is wholly unreliable. Engineers, until they are tested, can tell little, if anything, more about their durability than any one else. They are a cheap and convenient material, easily obtained and worked. I am of the opinion that now, before permanent bridges are built, the subject should receive the most serious attention of the Government and railroad company, and I would be derelict in duty if I failed to direct your excellency's notice especially to the subject. Including the bridge at Devil's Gate, which should by all means be of iron, as I have before stated and desire again to impress, six are necessary over the Weber alone in the distance of a few miles.

One culvert, having sandstone abutments and situated west of Morgan City, had given way, and as a further evidence of the unreliability of such stone used upon the road, (for they are manifestly all alike,) I must introduce into my report as germane, an extract from a letter I received from a gentleman in high official position who traveled over the road with his family. The letter bears date April 26, 1869, and while it was intended for my eye alone, I think the Government is entitled to its benefit.

[Extract.]

We had one or two narrow escapes on the Union Pacific Railroad. A bridge over Bitter Creek, just east of Green River, built upon abutments of soft sandstone, crumbled away under our train, precipitating the engine, tender, and express-car into the creek, and the passenger-car, in which I was, was only saved by a stringer or beam of the bridge catching into the roof and holding it suspended over the brink. We had to crawl out the best we could. One passenger was killed and several more or less injured. The conductor and engineer both prudently walked over first and then signaled the fireman to run us across. The bridge as well as two others in the vicinity had been examined the day previous and pronounced unsafe, and the officers were notified of the fact. The unanimous opinion is that it was criminal to attempt to cross. The western portion of the road is dangerous.

The writer is correct. The portion of the road he refers to is the worst I ever traveled over, and decidedly dangerous.

It is as well to state in this connection as anywhere else, that a gentleman long and still identified with the road, and who passes over it daily in the discharge of his duty, stated that he never rode over the bridges, so called, without holding his breath and drawing a long one of relief after he got over; that he considered them, especially the one at Devil's Gate, as dangerous, and he would not ride across at all but to give confidence to the passengers.

My memorandum-book shows (I quote from it) that from Devil's Gate "the road crosses to the east side of the Weber, passes around the mountain-spur, in a short distance reaches a safe but narrow valley, passes through it, then runs along the base of the mountain for one and a half miles, again crosses Weber River on trestles; but abutments for bridge and pier are being built of red sandstone; here a valley is reached which extends for some distance; an embankment from six to ten feet high would be swept away if the river should rise, as do our eastern streams; at end of the valley the road passes directly along the margin

of the river, cuts through a few mountain points; thence still continues along the valley up the Weber on an embankment of an average height of about six feet for some ten miles; width of embankment at grade-line about eight feet; embankment composed of gravel, gravel and clay, and sand and clay; some points, where the valley is wide, the road is sufficiently distant from the river to be secure from freshets; at the end of this valley the road takes its way through an opening between the mountains, then passes through another small valley, diverges from Weber River, enters Echo Cañon, and passes up Echo River to the Thousand-Mile tree."

Two tunnels are passed through; one 750 and one 260 feet long. These tunnels are not arched. They are cut through a sandstone formation, and are only wide enough for a single track, not a double one, as the standard of construction requires. With this exception, I think them safe.

While I may be possibly somewhat at fault in the details I have given, I feel satisfied I am substantially correct. But however important or unimportant these details, they cannot affect the great truths I shall now state:

First. The road is not, as the law requires, a "first class road."

Second. It is not supplied with the necessary buildings.

Third. It has not safe and substantial bridges.

Fourth. The tunnels are not wide enough for a double track.

Fifth. The road-bed at the grade-line is not of a uniform width of 14 feet, nor has it been properly leveled nor the rails lined.

Sixth. Especially would it be extremely dangerous for heavy trains to pass over the western portion of the road.

Seventh. The ties have sunken in many instances, sometimes at one end and sometimes entirely, the dirt being washed from under them; this is more generally the case on embankments. Miles upon miles of them were laid during the winter while the frost was in the ground. The rails, consequently, have an uneven bearing, and in numerous instances are bent, and appear, as you look back upon them, like a succession of small waves. I saw, however, a number of men at several different points engaged in raising the ends of the ties, and packing dirt under them so as to level the track as far as that would do it.

Two considerations remain which I deem of more importance than others:

First. The road is not ballasted, nor is any part of it. True, hands have been, and are now, here and there employed in throwing a few shovels of such material as the road-bed is composed, taken in all cases from the sides of the embankments, where they exist, between the ties. But this, I submit, is no compliance with the provision under the head of "ballasting" established by the board convened to fix upon a standard of construction. I again refer to that provision to be found with others in a former part of this report.

It is certainly of the highest moment that the road through Salt Lake Valley, which passes mainly over an alkali land, should be well ballasted with stone, certainly not less than eighteen inches in thickness. I leave this branch of the subject without further comment. The facts speak for themselves too plainly to be misinterpreted.

Cross-ties.—Cross-ties are laid with great irregularity on the bed of the road. They appear, indeed, to have been pitched on, and the rails spiked to them wherever they fell, provided they did not fall too far apart. No attention appears to have been paid to regularity of distance between the ties, they varying from fifteen to twenty-six inches,

the distance at the ends being rarely uniform, and the space between them presenting most frequently a quadrilateral figure of equal sides and unequal ends. This may be just as well for safety, yet it shows great carelessness and want of order.

The material objection is, however, to the ties themselves. They are of soft white pine on the road I examined, as well as on the Central Pacific, the first being obtained from the neighboring mountains, the latter from the Sierra Nevada. I transmit with my report a specimen of each, which I obtained at Promontory Summit. The board which fixed the standard of construction says of cross-ties:

> Oak or other suitable timber should be used where it can be obtained with reasonable transportation. When such timber cannot be had for all the ties at reasonable cost, then the best the country affords may be adopted; but if it be cottonwood or similar soft material it must be burnettized or kyanized thoroughly so as to increase its durability. But in all cases the joint-ties should be of oak or other suitable timber, the better to hold the spikes at these points.

The ties, as I have stated, are all white pine, there being none of oak or other desirable wood used at the joints, and none of them are burnettized or kyanized. Their average face, I should judge, from a number I measured, is about six and a half inches. Whether such ties were ever before used on any other road I am not advised. Cedar has been used; and while it lasts well in the ground, experience has shown it will not hold spikes. White pine will soon rot on the surface or in the ground; it is easily destroyed by heat or dampness, and is consequently affected by both the winter's snow and the summer's sun. Even in the dry latitude of Salt Lake it is not possible for it to last long.

Another important consideration in regard to pine ties is, will they hold the spike, and are they sufficiently heavy? I have no knowledge of such ties being used on roads crossing the Alleghanies, though the timber abounds on either hand along their lines. All road-beds have more or less flexibility, and when not properly ballasted the passage of trains must soon work both the tie and spike loose. They expect on the Pacific Road to make some twenty-five or thirty miles per hour. The New York Central, one of the best built and ballasted roads in the United States, as I have always understood, will bear no greater than an average speed of thirty miles per hour. The trains on the Pennsylvania Central Road run at about the same rate of speed as on the New York Central. This road is ballasted with broken stone small enough to pass through a two and a half inch ring, ten inches thick under the ties and eight between them. The ties are oak, laid close together, and one of them must be as heavy as four of those used on the Union Pacific Road. The Pennsylvania Central may be regarded as a "first-class" road.

While, after all, time may alone determine how long a pine tie will last or hold a spike, every one familiar with the softness of that wood will on the impulse exclaim, "It will not do." This will be the common judgment of the country, and I believe two years or less will demonstrate its correctness. There are, then, three objections to the ties, one being their liability to speedy rot; one the softness of the wood being so great it will not hold a spike; the other, they were neither burnettized nor kyanized according to the standard of construction.

The rails.—I had no opportunity of weighing a rail, but have no doubt but that they weigh fifty-six pounds to the yard. The iron is of American manufacture, and has the appearance of being a good article. The joints are braced by iron plates on each side of the rails, secured by four

bolts with heads and nuts, two on each side of the joint, the bolts, of course, passing through the plates and rails.

Grades and curves.—I do not regard it the duty of a commissioner to pass judgment on the engineering of the road. Should he undertake to do that it would require more labor than he could well perform. If the Government desires to ascertain whether "grades and curves have been settled upon principles of true economy and adaptation based upon scientific and careful investigation, having a due regard both to cost of construction and future working of the road," the only way to do it is to send out on the road a board of able engineers and give them ample time to perform the labor. A true profile of the road will show its windings to be frequent, on the western portion especially, and in instances great. Perhaps they might have been less.

Rolling-stock.—How many locomotive-engines and cars are attached to the road, I had no means of ascertaining. They are so scattered at different points that a commissioner could hardly obtain the information. As far as I could judge the road seemed to be fairly supplied with stock. I saw a number of freight-cars wrecked by the side of it; still a large number were left distributed at different points. As the local business of the road is small and must remain so for years in consequence of passing through an unpeopled country, I do not believe its business requires more freight-cars at present. More passenger-coaches and locomotives could be used to advantage, especially the former.

The telegraph.—The telegraph consists of a single wire stretched along the road, with temporary offices at the different stations, but answering the purpose for the present.

The road.—I met on Promontory Summit a leading citizen of California, who has from the first been prominently connected with the Central Pacific Road, and we traveled together for a number of miles. In our conversation he stated that the road (I understood him to mean the whole of it) was about two-thirds done, and that it would require from two to three years to finish and place it in good order, and that Congress should have retained one-third of the subsidies until it was finally completed. I concur in the views he expressed, except in this, that his estimate is low. It was provided in the charter for retaining in the Treasury from 15 to 25 per cent. of the bonds to insure the completion of the road, but this, like every other salutary provision enacted to protect the public interest, yielded to the power of the corporation.

Congress undertook to remedy this mistake by the passage of the resolution of April 10, 1869, which, among other things, provides:

> That the President is hereby authorized and required to withhold from each of said companies an amount of subsidy bonds, authorized to be issued by the United States under said acts [meaning acts for the construction of the Pacific railroad] sufficient to insure the full completion as a first-class road of all sections of such road on which bonds have already been issued, or, in lieu of such bonds, he may receive as such security an equal amount of first-mortgage bonds of such company. And if it shall appear to the President that the amount of subsidy bonds yet to be issued to either of said companies is insufficient to insure the full completion of such road, he may make requisition upon such company for a sufficient amount of bonds already issued to said company, or, in his discretion, of their first-mortgage bonds, to secure the full completion of the same, and, in default of obtaining such security as in this section provided, the President may authorize and direct the Attorney-General to institute such suits and proceedings in behalf and in the name of the United States, in any court of the United States having jurisdiction, as shall be necessary or proper to compel the giving of such security, and thereby and in any manner to protect the interest of the United States in said road, and to insure the full completion thereof as a first-class road, as required by law and the statutes in that case made.

I submit whether this resolution will answer the purpose for which it was intended. Is not the effort one to lock the door after the loss has

been sustained? General Warren estimates it will yet require an expenditure of $11,000,000 to perfect the roads, and even on this basis there are only about a third enough of undelivered bonds to effect the purpose. These bonds are claimed to be due for work recently executed, and altogether are not more than enough to pay the interest advanced by the Government for the companies, from whom nothing can be gained by engaging in a system of barter as proposed by the resolution. Why should the companies want the Government bonds in lieu of their own, unless they were to gain by the exchange? The proposition is a remarkable one.

If the roads are sold under a decree of foreclosure and should not bring enough, as they would not, to realize the par value of the bonds, there would of course be a loss on them. They are not even now worth in greenbacks but about ninety cents on the dollar, and when the Government bonds are paid out and these bonds taken in their place it is an acknowledgment of one of two things—either that the bonds of the railroads are intrinsically worth more than the Government bonds, or that Congress has made a present to the companies of the difference in favor of the Government bonds, and incurred a liability to pay interest besides.

The Attorney-General is powerless in the premises. He has no authority to force the companies to return bonds which have been paid to them, and it is not at all likely that they will stand in much fear of him. There is, however, a remedy for the Government which will be subsequently pointed out.

There is a vast difference between getting rails down so that cars can pass over them, and finishing a road. And as we are compelled to compete with European lines of transportation, the Pacific road never should have been used until it was completely finished; for a partly finished road, if put into use, acquires a reputation which it will require years to correct. So much has been said and so much written about the condition of this road that the very contradictions have deprived it of even what credit it is entitled to. We must have a road to the Pacific, and this road should be perfected. It passes over a line of country for one thousand and eighty-six miles, as far as I traveled on it, which for feasibility of construction, considering its length, is unequaled in the world. But very few formidable obstacles intervene. Plain after plain, valley after valley, plateau after plateau, open upon the eye as the cars speed along, and while one will see towering masses of rocks at a distance on the Black Hills, he will see very slight cuts through them. Then, again, when the Wasatch Mountains are reached, they do not, like the Alleghanies, present in the main one unbroken mass, but valleys open between them, and these valleys are always reached and descended by following the easy grade of some stream. I doubt if there are twenty-five miles of anything like heavy cutting in the whole distance. It is almost one continuous natural road-bed.

The facts which I have just stated, and others which I have presented in a former part of my report, demanded of the company a "first-class road in all respects." I will, however, state others bearing on the same point, premising what I shall add with the remark that the Government should keep its faith with the company and require the company to keep faith with it. If promises are to be taken on trust, let it be those of the Government, not those of the company.

The charter of the company provides that the Government bonds should be a first lien on the road, rolling-stock, &c.; that no more than every alternate section of land for ten miles on each side of the road should be given, and that payment of bonds should only be made when

forty miles were finished. No permission was conferred on the company to issue mortgage bonds at all. In this case, as in similar ones, the company went back to Congress, not to surrender any right they had acquired, for corporations never do that, but to ask additional grants and privileges. They asked that the Government bonds be made a second lien upon the road, and that they be allowed to issue mortgage bonds in amount equal to Government bonds, and that these mortgage bonds issued by themselves should be the first lien; that they should have every alternate section of land for twenty miles on each side of the road, instead of ten, and that they should receive bonds when each twenty miles of the road was done, instead of when each forty. The legislative body, unfortunately for the country, granted their request. The result will be a sale of the road on the company's mortgage bonds, which are a first lien, and the Government will get nothing unless it prevents itself being made a party to the proceedings, and thus forces a settlement or compromise, which, however, would amount to little or nothing in the end, for it would yield everything in the controversy.

Ten or fifteen millions of the company's mortgage bonds will fall into the hands of some one; how, can be imagined. The interest will not be paid; the bonds will be foreclosed, and who is to bid against the holder of them, representing, as he will, a powerful moneyed interest? No one. The Government cannot do it. If it owned the road ninety per cent. of its earnings would be stolen, and it would soon run down. No individual would have the means of doing it, and while the Government will lose the amount of her bonds, the holders of the major part of the mortgage bonds, who will not be shrewd capitalists, but unsuspecting widows and minors, will lose from 50 to 75 per cent. on their bonds, because they will only receive upon them a *pro rata* of what the road sells for. I am only writing here the experience and history of the past, and what interest prompts men to do. Whether the present company operate the road or not, (many believe it is not their purpose to do so,) the result will be substantially the same. The great object will be to get clear of the Government lien by foreclosure and sale under the mortgage bonds. This will be done unless the Government, as I have already suggested, refuses to allow itself to be made a party to the chancery proceedings, or unless the suggestions contained in the following paragraph are acted on. They are of the highest importance to the whole country.

The amendatory act of July 2, 1864, subordinates the Government lien, secured by the charter, to the mortgage bonds issued by the company. The twenty-second and last section of that act declares, "That Congress may at any time alter, amend, or repeal this act." The words "at any time" may perhaps be regarded as subject to some limitation. The courts might hold (I even doubt this) that this salutary protective clause would not apply after the completion of the road, or more certainly after its acceptance by the Government. Before that time there is no question, but it follows the mortgage bonds wherever they go. No matter in whose hands the bonds are found, the plea that they are held by innocent parties, so often interposed, cannot avail. The purchaser is bound to take notice of the law which constitutes a part of the condition of the bonds, as much so as if it were written upon their face. The road is not completed nor anything like it, and the power is yet in Congress to protect the Government. This should be done promptly and effectually. The Government bonds should be restored to a first lien, as they stood in the original charter, and the mortgage bonds of

the company should be made a second instead of a first lien. This done, all cavil and difficulty with the company will be at end. The Government has supplied means far more than sufficient to build the road, and why should it be given away? What moral or equitable right has any set of men to it? The money of the people built it.

The provisions in the amendatory act granting an extra quantity of land should also be repealed or suspended until the road is constructed as required by law. At least an opportunity should be offered for this legislation to transpire before another dollar is paid to the company.

While it cannot be regarded that Congress chose the most appropriate time to pass the resolution, approved April 10th last past, authorizing the President to appoint a commission of five to examine the whole road after the subsidies had been nearly all paid without any hope of their recovery, still that resolution must be regarded as an expression of Congress that it did not regard any part of the road as finally accepted. It may be that body was looking to the restoration of the Government lien by its action before it was precluded from doing so by lapse of time. The title of the resolution would seem to establish this conclusion. It is as follows:

Joint resolution for the protection of the interest of the United States in the Union Pacific Railroad Company, the Central Pacific Railroad Company, and for other purposes.

The "interest" of the Government is now attracting attention, and it is to be hoped that consideration will be sufficient to lift railroad matters out of the groove in which they have been running. Something for the people and not everything for corporations.

If the subsidies should be all paid and the lands conveyed now, the railroad companies would have no inducement to go on and finish their roads. On the contrary it would be for their interest to keep them only in possible running order, even if they intended to operate them in the future, until the sale is made on a portion of the mortgage bonds and the Government lien extinguished, for the reason that the worse condition that the road is in the less it will bring. The temptation to do this is too great to be resisted. Wiping out an incumbrance of some fifty-odd millions of dollars on the roads when it can be done by a short chancery proceeding is an advantage railroad gentlemen will not be slow to see and avail themselves of. The practice of Government and communities furnishing the means to build railroads and then allow those who take the contract to build them, for that is all it is, without investing a dollar of their private means, to own them after they are built, is not a very wise system of financiering on the one hand, but excessively shrewd on the other.

There is still another and more powerful argument why the railroad companies should be held to the strict letter of the contract and receive no more special favors. They are not released from the provision of the sixth section of the charter, which requires them to pay at maturity the principal and interest of the Government bonds; only from the provisions of the fifth section making the bonds a first lien. The following statement will show the amount of bonds issued on each mile of road, or to be issued:

UNION PACIFIC.

The eastern base of the Rocky Mountains was fixed at a point $525\frac{78}{1000}$ miles west of Omaha.

$525\frac{78}{1000}$	miles, at $16,000	$8,401,248
150	miles, at $48,000	7,200,000
$324\frac{922}{1000}$	miles, at $32,000,	10,397,504
1,000	miles	25,998,752

* From the 1,000-mile post to Promontory Summit, a distance of 86 miles, bonds have not been issued, neither has it been decided as to which company will be entitled to receive them. They would amount at $32,000 per mile to		$2,752,000
		28,750,752

CENTRAL PACIFIC.

Western base of Sierra Nevada Mountains was fixed at a point $7\frac{18}{100}$ miles west of Sacramento—

$7\frac{18}{100}$ miles, at $16,000	$114,880	
150 miles, at $48,000	7,200,000	
$512\frac{82}{100}$ miles, at $32,000	16,410,240	
670 miles	$28,750,752	
20 miles not reported on terminating at Promontory, at $32,000	640,000	
		24,365,120
1,776 miles, aggregating		53,115,872

The above account does not include $6,303,000 of bonds issued to the Eastern Division of the Union Pacific, $1,628,320 to Sioux City and Pacific, $1,600,000 to Central Branch Union Pacific, and $320,000 to Western Pacific, all issued under the same law, subject to the same conditions, and similar in effect. These bonds aggregate $9,851,320. Add the amount to the $53,115,872, and the result is $62,967,192 as the amount of railroad bonds issued by the Government. The different companies to whom the bonds were issued now owe the Government $3,334,963 for interest they should have paid on the bonds, but which the Government was compelled to pay for them to preserve its credit. From this, what may be expected in the future? If the company cannot now, with all the immense resources with which they have been supplied, pay the interest on the Government bonds, how can it hereafter pay interest on all the bonds?

I will not, however, run over in detail the whole question of finances as connected with the main road and branches. The Union Pacific is enough for illustrative purposes. The tabular statement given shows that the road has received or is to receive in Government bonds $28,750,752. Its mortgage bonds amount to precisely the same, so that the whole bonded debt of the road is or will be $57,401,504. Divide $28,750,752 by 1,086, the length of the road, and it will show the average paid upon it per mile in Government bonds is $26,473.98. This is, or should be, more than its actual cost. To illustrate, I will state that General M. F. Hurd, of Grinnell, Iowa, one of the engineers engaged on the work, informed me that it cost $3,000 per mile on an average (it would not cost over $1,500 in the States) to grade the road in Salt Lake Valley for fifty-three and eight-tenths miles; that the average cost of the ties was ninety cents apiece, or $2,340 for twenty-six hundred, the number used per mile; that the iron cost on the ground $100 per ton; that a hundred tons were used per mile, costing $10,000, and that it cost $600 per mile to lay the track. Add these several sums together, and they give $15,940 per mile as the actual cost, while the company receives $32,000 per mile from the Government. The $15,940 does not include an allowance for rolling-stock, telegraph, &c., but deduct $6,000 per mile for this purpose, and there remains $9,940 per mile. Still add to this the mortgage bonds for $32,000 per mile, first deducting

* It has often been asserted that the Union Pacific Railroad is not 1,086 miles long. I know nothing of the truth of this; the Government, however, should have all the roads upon which it has issued bonds measured.

$6,000 per mile to be expended for telegraph, rolling-stock, &c., making the whole allowance to be used for such purpose $12,000 per mile, and add the remainder, $26,000 per mile and the $9,940 together, and it will show a surplus of $35,940 per mile above the cost of the road. This result will enable a man of ordinary intelligence to determine whether the members of the company paid anything out of their own pockets to build it. But take the average per mile for the whole distance of 1,086 miles furnished in Government bonds, to wit, $26,473.98, and who doubts but this of itself should be sufficient to build and equip the road and construct a line of telegraph; and there is still left $32,000 per mile in mortgage-bonds in the hands of the company, making in all $34,752,000 for the whole length of the road—1,086 miles. The figures are drawn from experience and reason. The exact amount made by the company will never be known, for it will never be to its advantage that it should be. The company received, besides the bonds from the Government, every alternate section of land on each side of the road for twenty miles, aggregating for the 1,086 miles, if it followed a direct line, (as it does not it will be somewhat less,) 13,900,800 acres, or 12,800 acres per mile, which, at three dollars per acre, amounts to $41,702,400. Add this amount to the $34,752,000 of bonds, and we have a sum total of $75,454,400—enough to make seventy-five individual millionaires. But throw half of this away, and you have nearly thirty-eight millions of profit left for distribution among a few men, to say nothing of capital stock. I am satisfied my estimate is low.

Divide $53,115,872, the whole amount of Government bonded debt on the two roads, by 1,776, the number of miles from Omaha to Sacramento, and it gives $29,907.58 as the average Government subsidy per mile. Add to this the same amount for mortgage-bonds, and it will show the whole average bonded debt of the road to be $59,815.16 per mile, or $106,231,744 in all, upon which the Government has only a second lien on half the amount—$53,115,872. Upon the main road and branches, inclusive, it has a second lien for $62,967,192, furnished in bonds bearing 6 per cent. interest. It is an easy thing to create a public debt, but not so easy to pay it out of the labor of the producing classes, who have to pay all public debts, and not the millionaire.

The Union Pacific (I know nothing of the Central Pacific in this regard) has provided for issuing $100,000,000 of capital stock, and has actually issued about $25,000,000. This stock has been selling in the market heretofore at seventy-five to eighty cents on the dollar. How much it is worth now I am not advised. How much it will be worth when it is not held by those who hold the controlling power over the road, intelligent men can judge.

RECAPITULATION.

Railroad companies to the people, DR.

For $53,115,872 of Government bonds.
For 53,115,872 of mortgage-bonds.
For 3,334,962 interest paid for their use.
For 60,477,056 for 23,492,352 acres public land.
For 100,000,000, amount of capital stock authorized to be issued on the above basis, about twenty or twenty-five per cent. of which is in the hands of the public.
For ————, income of said roads.
For the railroads themselves, the rolling-stock, and property of every nature and kind connected therewith.

The people to the railroad companies, DR.

For the privilege of riding over said roads by paying for it.

The amount realized for the capital stock, whether twenty-five, fifty, or one hundred millions, is so much additional gain to the company.

So the companies have the bonds, $106,231,744; the benefits of $3,334,962 interest paid for them by the Government; the capital stock, amounting to, as above stated, $100,000,000; the lands, $60,477,056, proceeds of 23,492,352 acres, and own the road and all the property connected with it besides. This is what is called in this country the enterprise of capital and its investment for the public good. It may be a misnomer.

If Congress made a bad bargain, I am not for repudiating it. I think, however, the Government should protect its interests by availing itself of all reserved rights and insisting upon a rigid compliance on the part of the companies with their engagements before anything more is paid or the lands patented. There is certainly nothing wrong in this. The right to pass over the roads, such as they are, by paying for it, is all the people will get for the enormous amount they have been compelled to contribute for their construction, and they are certainly entitled to have a "first-class road in all respects," that they may be assured of life and limb. Unusual care should be taken in operating this road as well as in constructing it, for if a serious calamity should happen to a passenger train it would be almost impossible to obtain medical aid and proper shelter for the wounded, so sparsely is the country settled.

I will add, in conclusion, that on my return to Omaha, I was shown a prepared report, gotten up by an officer of the company, on the first section of twenty miles of the road west of the last accepted section, setting forth it was constructed in strict compliance with law, and was told that other similar reports for the remaining sections were in progress of preparation; that such was the accustomed way for reports to be prepared for the commissioners, and then they signed them. Not being satisfied that I could, without violation of duty, adopt the usual form and sign such a paper, I have prepared this report for myself, as expressive of my own views.

PERSONAL.

I regret being compelled to go over the road without my associates, in consequence of a misunderstanding of the time the commission was to meet at Omaha, growing out of an unexpected delay in instructions. I should have been highly gratified to have accompanied General Warren and Hon. James F. Wilson. As that pleasure was denied me, I was obliged to perform my duty by making the necessary examination alone. Not even the privilege of consulting either of these gentlemen before this report was prepared was afforded me. I therefore submit it for myself.

Most respectfully,

ISAAC N. MORRIS,
Commissioner.

His Excellency U. S. GRANT,
President of the United States.

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